

### **LAUNCH SERVICES PROGRAM**







# Pardon the Interruption Meeting October 2007









# **Fleet and Mission Status**

October 18, 2007 LSP Internal Use Only 2



# Dawn Project Summary

Dawn Mission Launch Date 2007/09 (U/R) Launch Vehicle Delta II Planning Purposes: 09/26/07 Launch Period Window PPF ASO-KSC

	Aug	Sep	Oct
OVERALL MISSION	Y	G	6

LAUNCH SERVICES PROGRAM

### MISSION MANAGEMENT

Observatory Status Manifest/Range

Integrated Schedule

ICD

CDRLs (S/C & LSC)

Aug	Sep	Oct
G	G	6
G	G	G
G	G	G
G	G	G
G	G	G

N/A

0

N/A

N/A

### LAUNCH SITE

LSSP Customer Inputs PPF

Launch Site Unique Spacecraft OPS

Aug	Sep	Oct
6	G	0
G	G	0
6	G	0
G	G	0
G	G	0

# SAFETY & MISSION ASSURANCE

Mission Assurance Safety Quality

Reliability

100 ds	85GR	
G	γ	0
G	G	0
Υ	Υ	0
G	G	0

Aug Sep Oct

### **ENGINEERING**

Launch Vehicle Mission Specific Certification

Mission Analysis

ERS/ERB

Launch PAD/GSE

Mission Unique IV&V

L	opacecial Oi o	
	COMMA 9 TELEMETO	.,

### COMM & TELEMETRY

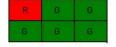
Communications

Telemetry

G	G	0
Υ	G	0

### **BUSINESS**

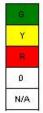
Budget Contracts



# LEGEND

Proceeding on Plan Area of Concern Significant Problem Not Evaluated

Not Applicable



### DOWNRANGE TELEMETRY

**Ground Stations** 

Deployables

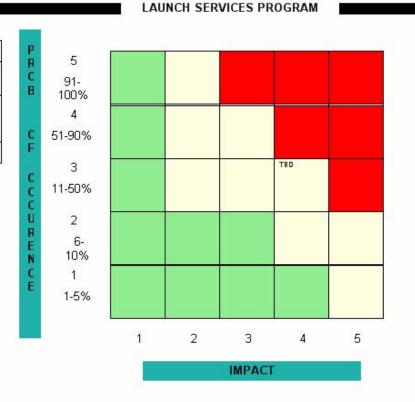
P-3/OTTR

G	G	G
Υ	G	G
Υ	G	G



# Dawn - Open/Accepted Risks

# Condition RYG Trend TBD LS SMA has noted human error and process issues that indicate that ULA's Quality Management System Corrective Actions are not preventing re-occurance.





# Dawn - Actions / Issues / Concerns

	LAUNCH SERVICES PROGRAM
There are no Actions.	
There are no Issues or Concerns.	
The state of the s	



# Dawn - Significant Events

### LAUNCH SERVICES PROGRAM

Accomplished	
Compatability Drawing Update	05/18/2007
PL to BH Wiring Drawing Update	05/18/2007
ICD Revision Update	05/18/2007
DII Heavy Transonic Anomaly ERB	09/28/2006-9/28/07
S/C Environmental Testing (Acoustic, Vib, Shock)	1/14/07-2/16/07
S/C Thermal Vacuum Testing	1/14/07-02/16/2007
S/C arrival at Launch Site	04/10/2007-4/10/07
Mission Analysis Review	05/01/2007
S/C PreShip Review	3/20/07-3/21/07
Ground Ops Readiness Review	3/6/07-3/6/07
Pre-VOS	05/16/2007
Post S/C Environmental Test Review	03/19/2007
79XXH Transonic Anomaly ERB (Dawn Specific)	05/15/2007
Replaced S/C HVEA box & completed acoustic retest	04/02/2007-04/09/2007
Dawn LVRR	05/24/2007
Dawn S/C MRR	05/30/2007
Dawn SMSR	06/20/2007
Dawn S/C Wet Spin	06/12/2007
Dawn S/C - 3rd Stg Mate	06/21/2007
Dawn S/C - LV Mate	08/27/2007
Dawn FRR	09/21/2007-09/21/2007
Dawn LMCM/Dress Rehearsal	09/22/2007
Dawn LRR	09/24/2007

There are no items planned

Dawn LSRR Update	09/10/2007
Dawn F6 - Flt Program Verification	09/13/2007



# Dawn Mission Management

Armando Piloto

### LAUNCH SERVICES PROGRAM

### Mission Launch Date

Orbit Requirement

Launch Vehicle Class Launch Period Window

PPF

Mass (kg)

PAD

	Dawn
-	2007/09 (U/R)
km	C3=4-6 n^2/S^2/DLR/RLA
	Delta II
Pla	anning Purposes: 09/26/07
	ASO-KSC
	1270
	SLC-17 B

	<u>Obs</u>
	Obs
	Sch
	Bud
	Deliv
3	Test
	ATL
	Instr

servatory Status	Aug	Sep	Oct
servatory Status	G	6	G
hedule	G	6	G
dget	R	G	G
liverables	G	6	G
sting	G	6	G
LO	G	6	G
trument	G	8	G
	80		

# Program: PM LVI MM ΙE LSIM PIM MAM MCE MTE

Mission Center:

Keyur P	atel
Tom Sh	naw
Armando	Piloto
Jim Hoffi	man
William Va	n Dyke
Randy M	izelle
Craig Sch	reiber
Mike Pa	tton

Nathan Wood

JPL

Discovery



ICD

Aug	Sep	Oct	
G	6	G	I

Launch	<u>Vehicle</u>
Status	

Integrated Sch	edul
CDRLs (S/C & I	SC)
Manifest/Range	е
Ground Stations	
Deployables	

Manifest/Range
Ground Stations
Deployables
P-3/OTTR

G	G
G	G
G	G
G	G
G	G
G	G
	6 6 6

SIGNED SCNS: SCNS IN REVIEW		IN REVIEW	
SCN#	DATE SIGNED	SCN#	DATE SIGNED
3	06/15/2006	20	date
8	08/02/2006		
1	05/21/2007		
2	05/21/2007		
4	09/06/2006		
5	09/06/2006		
6	09/06/2006		
9	09/11/2006		
10	09/13/2006		
7	05/21/2007		
11	05/21/2007		
12	05/21/2007		
13	05/21/2007		
14	05/21/2007		
15	05/21/2007		
16	05/21/2007		
17	05/21/2007		
18	05/21/2007		
19	05/21/2007		



# Dawn - Engineering

Jim Hoffman

### LAUNCH SERVICES PROGRAM

	Aug	Sep	Oct
Launch Vehicle	G	G	G
Payload Fairing	G	G	G
First Stage	G	G	G
Second Stage	G	G	G
Third Stage	G	G	G
Payload Attach Fitting	G	G	G
Other	N/A	0	N/A
Mission Specific	G	G	G
Certification	N/A	0	N/A
Mission Analysis	Y	G	G
ERS/ERB	G	G	G
Launch PAD/GSE	G	G	G
Mission Unique IV&V	N/A	0	N/A

REQUIREMENT VERIFIC	REQUIREMENT VERIFICATION STATUS					
NUMBER OF REQUIREMENTS	107					
VERIFIED TO DATE	107					

LAUNCH PAD / GSE MODS (IF APPLICABLE)	
Fiber Optic Cable Updgrade (Optional Use)	

# MISSION UNIQUE STUDIES (IF APPLICABLE) Dawn S/C N2H4 and Xe Tank Nutation Time Constant (NTC) Delta II Heavy Transonic Event Recovery Studies



# Dawn - Mission ERB Status

Jim Hoffman

### LAUNCH SERVICES PROGRAM

		ERB Req?		Board Held?			Closure			
R/Y/G	R/Y/G ERS# TITLE	Υ	N	Υ	N	N/A	Al	ENG.	OCE	
0	04-141	Dawn Turn-on	$\square$		$\square$			$\square$		$\square$
0	04-532	Dawn Mission ICD						Ø		
0	05-88	First Decatur Build of 9.5 ft Metal PLF	$\square$		$\square$			$\square$	Ø	$\square$
0	04-474	79XX-H Transonic Observation Reconvene for Dawn Vehicle	☑			☑		☑	☑	☑
0	05-59	Delta II/Dawn MECO Assessment						$\square$		$\square$
0	03-31	792xH GOX Line and Fuel Press Line Interference w/ Tunnel Covers			☑			☑	☑	☑
0	06-389	Delta II Heavy Return-to-Flight SFI - Dawn	$\square$		$\square$			$\square$		$\square$
0	07-22	Dawn Separation System Debris	$\square$		$\square$			☑	$\square$	☑
0	07-88	Dawn Purge Fitting Location ICD Waiver	$\square$		$\square$			☑	☑	☑
0	07-128	FM-19 circumferential Weld Defects						☑	$\square$	$\square$
0	07-133	Dawn PLF Sparesyl Overhang and Bulb Seal Compression	☑		☑			☑	☑	☑



# Dawn - Vehicle ERB Status

Jim Hoffman

### LAUNCH SERVICES PROGRAM

	¢.		ERB	Board Held?		Closure				
R/Y/G	ERS#	TITLE	Y	N	Υ	N	N/A	AI	ENG.	OCE
0	05-36	Deep Impact 2nd Stage Propellant Usage	☑							☑
0	06-284	Themis 2nd Stg Tank Leak								☑
0	05-378	Delta II, RS-27 Engine -51 Hoop/Band Separation	Ø		Ø			Ø	Ø	Ø
0	06-358	Delta II CTLX Test Anomaly						$\square$		$\square$
0	05-71	Delta II 3rd Stg Transmitter Anderson Xtal Failure Requal	$\square$			☑		☑	$\square$	☑
0	06-318	Delta II Electronics Package Capacitor Anomalies			☑			Ø		☑
0	06-334	Semicoa Transistor Failure						$\square$		$\square$
0	07-132	Ordnance Timer LAT Anomalies								$\square$
0	07-156	3rd Stg 40-Sec Ordnance Delay Timer								☑



# Dawn - Launch Site

William Van Dyke

LAUNCH SERVICES PROGRAM

Aug Sep Oct

0

0

0

0

Aug Sep Oct LSSP 0

LSSP	Planned	Released
Preliminary	3/24/05	3/24/05
Baseline	9/30/06	01/05/2007

CUSTOMER INPUTS  G G O  DELIVERABLES Aug Sep Oct Security and Badging G G O  Training and Personnel Cert Contingency Plans G G O  Safety LSIM Radiation Control Operational Plans G G O		Aug	Sep	Oct
Security and Badging  Training and Personnel Cert  Contingency Plans  Safety LSIM  Radiation Control  G  G  O  C  O  C  O  C  O  O  O  O	CUSTOMER INPUTS	G	G	0
Training and Personnel Cert G G O  Contingency Plans G G O  Safety LSIM G G O  Radiation Control 0 0 0	DELIVERABLES	Aug	Sep	Oct
Contingency Plans  G G 0  Safety LSIM  Radiation Control  C G 0  C C 0	Security and Badging	G	G	0
Safety LSIM         G         G         O           Radiation Control         0         0         0	Training and Personnel Cert	G	G	0
Radiation Control 0 0 0	Contingency Plans	G	G	0
	Safety LSIM	G	G	0
Operational Plans G G 0	Radiation Control	0	0	0
	Operational Plans	G	G	0

### UNIQUE REQUIREMENTS

LAUNCH SITE UNIQUE		
Third Stage Cleaning to VC- 6.	G	

Spacecraft OPS

Spacecraft Schedule is achieveable.

G	G	0
G	G	0

	G	G	0
nercial PPF on contract.	G	G	0
Ops do NOT need ded occupancy.	G	G	0
able services at ASO	G	G	0



# Dawn - Business

Randy Mizelle

### LAUNCH SERVICES PROGRAM

Budget Contracts



Milestone	Date
Milestone #1	17 Mar 04
Milestone #10	07/07/2007
Milestone #2	17 Jun 04
Milestone #3	17 Sep 04
Milestone #4	17 Dec 04
Milestone #5	17 Mar 05
Milestone #6	17 Jun 05
Milestone #7	17 Sep 05
Milestone #8	17 Dec 05
Milestone #9	22 May 07

Open Milestone Payment
Paid Milestone

Contract Status					
Launch Services					
Contract Mod Number Description		Description			
	94	NSS 20.3.3 / Quick Turnaround CLA.			
	141	Remove NSS 2.2.1			
	202	CCR 169 move launch date 6/17/2006 to NET 11/17/2006.			
*	103	Mission ATP			
3	271	NSS 20.1 / Pedigree Review & NSS 35.1 / Additional 70 Mission Console Notebooks			
\$	293	Spacecraft De-stack			
	291	Launch Delay from June 30, 2007 to July 7, 2007			
	298	Spacecraft Re-stack			
	303	Launch Delay from July 7, 2007 to September 26, 2007			

				_
Task Assignments	Number	Description	Completion Date	Invoice Paid Date
	NLSB-075	Trajectory Sequence Analysis.	11/28/2003	5/24/2004
	NLSB-146	Delta II Sine and Random.	5/1/2005	11/22/05
	NLSB-147	Trajectory Sequence Analysis #2.	1/28/2005	3/21/2005
	NLSB-170	Dawn Trajectory Analysis.	9/23/2005	1/3/2006
	NLSB-172	Principal Axis Misalignment.	2/3/2006	04/05/2006
	NLSB-205R1	Principal Axis Misalignment 2	6/30/2006	8/2/2006
	NLSB-212	Limited PMA.	6/30/2006	7/19/2006
	NLSB-227	PMA Long Coast.	8/11/2006	8/24/06
	NLSB-244	Second Shock Test	12/15/2006	1/18/07
	NLSB-249	Xenon Tank Review Support	02/28/2007	06/21/2007
	NLSB-250	3rd Stage Dome Cleaning Test	11/30/2006	12/13/2006
	NLSB-264	3712A Clampband Debris Shields	5/31/07	07/10/2007
	NLSB-270	Third Stage Dom and PAF cleaning	06/20/2007	08/13/2007
	NLSB-276	Propellant Liner Insulation Material (PLIM) Testing	09/14/2007	10/03/2007
	NLSB-283	RS-27 Engine Pedigree Review	06/06/2007	07/10/2007
	NLSB-285	Telemetry Acquisition Assistance	10/03/2007	
	NLSB-289	Dawn & Phoenix LOX Fill & Drain Valve Replacement	06/28/2007	08/13/2007
	NLSB-290	Additional Spacecraft Weighing	06/30/2007	08/13/2007
	NLSB-291	Additional DTO Best Estimate Trajectory Analysis	09/07/2007	
	NLSB-297	STAR-48B ECP-40 Evaluation	07/31/2007	
	NSLB-095	Pre ATP support.	3/31/2004	7/12/2004
	NSLB-156	PAF strength model.	5/30/2005	6/27/2005
Contract Mod (PPF)	Number	Description	1	1
	09	Extend facility occupancy to September 11, 2007		
	02	Revise facility occupancy & launch dates to 3/26/07 and 6 Support Plan	6/20/07; Baseline La	aunch Site

Contract Mo	od (PPF)	Number	Description	
		06	Revise facility occupancy date to 3/26/07 & launch date to 6/20/07; Baseline LSSP added to contract with additional requirements.	
		07	Revise facility occupancy date to 4/5/07; added new LSSP requirements in Communications Annex document.	
08 Revise launch date from 6/20/07 to 6/30/07 & Revise LSSP Requireme		Revise launch date from 6/20/07 to 6/30/07 & Revise LSSP Requirement		
01 Revise Facility Occupancy date to 8/17/06 and launch date to 11/17/06		Revise Facility Occupancy date to 8/17/06 and launch date to 11/17/06		
There are no	There are no Other Contract Mods			
	Issues			
Υ	Pursuing a contractor delay due to the heavy anomaly for the 6/20/07 launch delay and no-fault delays from 6/20 launch date to the September/October opportunity.			



## Dawn - Safety and Mission Assurance

Craig Schreiber

### LAUNCH SERVICES PROGRAM Evidence of Completion Assurance Verification Areas Status In Work Complete Aug Sep Oct Quality 0 V Software / Hardware Problems Continuing to monitor ULA-Boeing's response to Quality Management System risk, and evaluating process 0 concerns predicated by Aero loads issues, as they relate to ongoing processing. $\checkmark$ Alerts No GIDEPs at this time 0 $\checkmark$ Audits/Inspections/Surveillances Will continue to perform planned surveillance of Dawn re-0 $\overline{\mathbf{v}}$ Limited Life Items Continuing to monitor Dawn ordnance service life issues. No-test extensions have been approved for 3 ordnance 0 0 Reliability $\overline{\mathbf{v}}$ 0 FMEA/Fishbones/Equivalent No Activity. 0 V Reliability Assessments Reliability reduction due to risks is approximately 1% 0 0 Safety $\checkmark$ Requirements Definitions No Issues. 0 0 $\checkmark$ No issues 0 0 Range Safety & Mission Flight Rules $\checkmark$ Licenses/Use Authorizations No issues 0 0 V 0 0 Safety Documentation No issues $\checkmark$ LIV: Two USAF Non-compliances (1 - Waiver, 1 - Meets Non-compliances Intent Certification) and two NRS Variance (Waiver) One 0 AF MIC pending $\overline{\mathbf{v}}$ Contingency Planning No Issues. 0 0 Y 0 Mission Assurance $\checkmark$ Lessons Learned Continuous 0 0 $\checkmark$ 0 0 First Flight/Mission Unique items No issues $\checkmark$ Test/Qualification/Certification No issues 0 V Mission Assurance Assessments Evaluating impact of process breakdown with various 0 Aero loads issues, ST308 Connector Issue One new risk (RIFCA) opened during Phoenix campaign. Risk Management 0 (See Risk chart)



# Dawn Comm & Telemetry

Mike Patton and Nathan Wood

### LAUNCH SERVICES PROGRAM

### Communications

Voice Comm

Data Comm

Networks

Video Comm

Timing

RF Comm

LSSP Comm Annex

Aug	Sep	Oct
G	G	0
G	G	0
G	G	0
G	G	0
G	G	0
G	G	0
G	G	0
G	G	0

### Telemetry

Decommutation Tables

Data Integrity Test

Software Lockdown

Software Inventory

Console Configuration

Console Checkout

Aug	Sep	Oct
Υ	G	0
0	G	0
0	G	0
0	G	0
0	G	0
0	G	0
0	G	0



# **OSTM Project Summary**

John F. Kennedy Space Center LAUNCH SERVICES PROGRAM OSTM Mission 2008/06/15 Launch Date Sep Oct Aug Launch Vehicle Delta II **OVERALL MISSION** Launch Period Window Commercial PPF PPF MISSION MANAGEMENT Sep Oct LAUNCH SITE Sep Oct SAFETY & MISSION ASSURANCE Sep Oct Aug Observatory Status LSSP Mission Assurance Manifest/Range Customer Inputs Safety Integrated Schedule PPF Quality Υ ICD Launch Site Unique Reliability CDRLs (S/C & LSC) Spacecraft OPS **BUSINESS ENGINEERING** COMM & TELEMETRY Budget Launch Vehicle Communications Contracts Mission Specific Telemetry 0 0 0 Certification 0 0 Mission Analysis LEGEND ERS/ERB Proceeding on Plan Launch PAD/GSE Area of Concern Mission Unique IV&V Significant Problem R Not Evaluated 0 DOWNRANGE TELEMETRY Not Applicable N/A Ground Stations 0 0

0

0

0

0

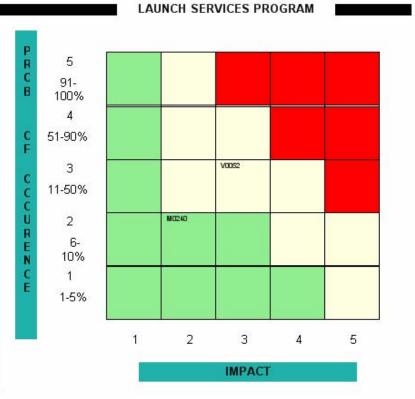
Deployables

P-3/OTTR



# OSTM - Open/Accepted Risks

	6	Condition
RYG Trend	RiskID	Consequence
200		OSTM Load Isolation System (Softride) is a first flight on a Delta II LV and is not qualified for this LV
G		Spacecraft could experience lateral and axial loads that exceeds the spacecraft qualification levels and could impact mission success
G	M0240	The OSTM mission requires a Commercial Payload Processing Facility (PPF) to perform their launch site processing at Vandenberg AFB, but no contract is currently in place.
		The PPF for OSTM may not be ready to accept the spacecraft when the spacecraft is ready for delivery to the launch site.
G	V0052	LSP SMA has noted human error and process issues that indicate that ULA Delta quality management system corrective actions are not preventing reocurrence.
		The re-ocucurrence of undetected human errors and process problems can lead to major damage or loss of flight hardware or GSE.





# OSTM - Actions / Issues / Concerns

	LAUNCH SERVICES PROGRAM
There are no Actions.	*
There are no Actions.	

Mission Summary Map	G/Y/R	ISSUES / CONCERNS	WI/ERS/Risk/ Problem	Open Date	Due Date
Engineering	0	First flight of CSA Softride on Delta-II to mitigate the spacecraft c.g lateral load factors and the payload axial MECO load factors.	VVI	7/19/2005	10/31/2007
Engineering	0	RF hazard analysis resulted in unexpected high E-field levels due to the conservative assumptions made in the analysis. Analysis indicated that the SC cannot radiate/transmit after fairing encapsulation (with and without RF hats installed). SC provided the updated antenna characteristics (Antenna gain & boresight angle) and ULA is redoing the analysis.		06/14/2007	09/10/2007
Engineering	0	The preliminary separation analysis showed that the roll rate and transverse rate requiremenst as listed ion the ICD are not met. This is being worked and will be a topic of discussion at the Ausgut MIWG. (GH 08-07)		08/14/2007	08/31/2007



# OSTM - Significant Events

### LAUNCH SERVICES PROGRAM

Accomplished	
CCR written to change the configuration of the launch vehicle from a 7320-9.5 to a 7320-10.	
Range Concept Briefing	05/18/05
CLA data delivered to S/C	**
S/C PDR	Nov-2005
Boeing performed the Quick CLA to determine loads on S/C with 10 Ft fairing.	
Preliminary Isolation system design	
Kick off MIWG	06/29/06
ATP	Mar-2006
Study(TA) on load alleviation systems	
RFP to take Isolation system to PDR	
Satellite CDR	10/24/06-10/24/2006
MIWG/GOWG at JPL	11/16/2006-Nov. 2006
SoftRide Isolation System PDR	02/8/2007-2/8/2007
Meeting with CEO office to present Softride System for OSTM	11/21/2006-11/21/2006
MIWG/GOWG	02/21/2007-02/22/2007
Isolation System Phase II Turn on	3/23/07-4/3/07
OSTM Spacecraft Load Isolation System PDR & ERB	02/08/2007-02/08/2007
ICD ERB	4/8/07-4/8/07
ICD ERB Peer Review with Integration Group completed.	04/04/2007-04/04/2007
Softride system - Component Level CDR (KSC ERB held in conjunction with the CDR / ERS-07-142)	5/15/07-05/15/2007

There are no items planned	

Softride Component Level CDR - Action Items Responses (ERB Reconvene) prior to start of QUal Test Program.	06/05/2007-06/05/2007
OSTM 3715 PAF HAR at Astrium, England	07/11/2007-07/13/2007
OSTM MIWG & GOWG @ Alcatel, France	08/30/2007-09/02/2007
OSTM Separation shock Tests at Alcatel, France	08/27/2007-08/29/2007
Softride System- Isolators Qualification Testing at CSA	06/26/2007-07/21/2007
Softride - System Level CDR @ HB ( LSP ERB in conjunction) - ERB completed partialy. A recontinue is scheduled for August 21.	08/09/2007-08/21/2007
OSTM Vibration Testing at Alcatel, France . Accomplshed successfully	08/28/2007-08/13/2007
ICD Signed off.	06/14/2007-9/02/07
Payload to Blockhouse Wiring Diagram reviewed by LSP team and comments provided to ULA. Updated version in work	06/08/2007-06/18/2007
RF Hazard Analysis Review complete. Errors found in the analysis due to conservative assumptions. ULA is updating the analysis.	06/05/2007-06/18/2007
Preliminary Mission Analysis Input reviewed and submitted to ULA.	04/10/2007-04/16/2007
Preliminary Mission Analysis results expected July 13.	07/13/2007-9/02/07
Payload Separation Analysis- Initial Memo expected June 15.	06/15/2007-07/21/2007
OSTM Fit Check at Alcatel, France	10/08/2007-10/12/2007



# **OSTM Mission Management**

Armando Piloto

### LAUNCH SERVICES PROGRAM

Mission	OSTM
Launch Date	2008/06/15
Orbit Requirement	1336 km polar, degree incl.
Launch Vehicle Class	Delta II
Launch Period Window	
PPF	Commercial Pl
Mass (kg)	620 kg. /
PAD	SLC-2

Observatory Status	Aug
Observatory Status	G
Schedule	G
Budget	G
Deliverables	G
Testing	G
ATLO	G
Instrument	G
	82.

Program:  PM LVI  MM IE	Mission Center
LVI MM IE	Program:
MM IE	РМ
IE	_VI
70.000000	мм
1.0014	E
LSIM	LSIM
PIM	PIM
MAM	MAM
MCE	мсЕ
MTE	MTE

Pai	rag Vase
Mike	Gallagher
Arma	ando Piloto
Thon	nas Frattin
Julie S	Schneringe
Ran	dy Mizelle
Home	ero Hidalgo
Mik	e Patton
Alex	Biamonte

**JPL** 

Aug	Sep	Oct
G	G	G
SA-0000		no SCNs
	6	Aug Sep  G G  There are Review

<u>Status</u>
Integrated Schedule
CDRLs (S/C & LSC)
Manifest/Range
Ground Stations
Deployables
P-3/OTTR

Launch Vehicle

G	G	G
G	G	G
G	G	G
D	0	0
D	0	0
D	0	0

Oct



# OSTM - Engineering

Thomas Frattin

### LAUNCH SERVICES PROGRAM

	Aug	Sep	Oct
Launch Vehicle	G	G	G
Payload Fairing	G	G	G
First Stage	G	G	G
Second Stage	G	G	G
Third Stage	0	0	0
Payload Attach Fitting	G	G	G
Other	0	0	0
Mission Specific	G	G	G
Certification	0	0	0
Mission Analysis	G	G	G
ERS/ERB	G	G	G
Launch PAD/GSE	G	G	G
Mission Unique IV&V	G	G	G

REQUIREMENT VERIF	ICATION STATUS
NUMBER OF REQUIREMENTS	0
VERIFIED TO DATE	0

LAUNCH PAD / GSE MODS (IF APPLICABLE)	
There are none.	

MISSION UNIQUE STUDIES (IF APPLICABLE)

CLA to determine S/C loads



# OSTM - Mission ERB Status

Thomas Frattin

### LAUNCH SERVICES PROGRAM

			ERB	Req?	77	Board	Held?	0	Closure	
R/Y/G	ERS#	TITLE	Υ	N	Y	N	N/A	AI	ENG.	OCE
0	ERB-06-330	OSTM Soft Ride System- System Level PDR	$\square$					☑		
0	ERB-07-142	OSTM Softride System- Component Level CDR								
0	ERB-07-73	OSTM ICD ERB	$\square$		Ø					
0	ERB-07-181	OSTM SoftRide System- System Level CDR			Ø					
0	ERB-07-273	OSTM TPAF		$\square$						



# OSTM - Vehicle ERB Status

Thomas Frattin

LALIN	ICH	SFRV	ICES	PRO	GRAN

There are no Vehicle ERBs for this mission.



# OSTM - Launch Site

Julie Schneringer

LAUNCH SERVICES PROGRAM

Aug Sep Oct
G G G

LSSP	Planned	Released
Preliminary	03/15/2007	05/18/2007
Baseline	12/12/2007	

	Aug	Sep	Oct
CUSTOMER INPUTS	G	G	G
DELIVERABLES	Aug	Sep	Oct
Security and Badging	G	G	G
Training and Personnel Cert	G	G	G
Contingency Plans	G	G	G
Safety LSIM	G	G	G
Radiation Control	G	G	G
Operational Plans	G	G	G

### UNIQUE REQUIREMENTS

	Aug	Sep	Oct
LAUNCH SITE UNIQUE	G	G	G
Foreign National Escorts	G	G	G
European Power Supplies/UPS	G	G	G
PPF	G	G	G
Commerical PPF	G	G	G
PPF TAA	Υ	Υ	Υ
Spacecraft OPS	G	G	G
Fueling	G	G	G



# OSTM - Business

Randy Mizelle

### LAUNCH SERVICES PROGRAM

Open Milestone Payment

Paid Milestone

Budget Contracts

Aug	Sep	Oct
G	G	G
G	G	G

Milestone	Date	
Milestone #1	03/15/06	
Milestone #10	06/15/08	
Milestone #2	06/15/06	
Milestone #3	10/30/2006	
Milestone #4	2/6/07	
Milestone #5	04/4/07	
Milestone #6	10/03/2007	
Milestone #7	09/15/07	
Milestone #8	12/15/07	
Milestone #9	03/15/08	

Contract Status  Launch Services			
	212	Flyout costs + Mission ATP	
	125	Flyout costs	
	240	NSS 32.1 FY06 VAFB Launch Site Maintenance	
	057	NSS 30.1 Long-lead Mat <sup>I</sup> l/Adv for NSS 33.2 Mission critical FY03	
3	050	Original 19-Pack Launch Date 12/31/2006	
	163	NSS 2.1.2 - 9.5ft to 10ft PLF	
	175	NSS 20.3.3 Quick Turnaround Coupled Loads	
Contract Mod (LD)	Number	Description	
	136	Delay from 12/31/06 to 10/1/07	

Contract Mod (LD)	Number	Description		
	159	Launch delay from 10/1/07 to 4/1/08		
	212	Delay from 4/1/08 to 6/15/08		
Task Assignments	Number	Description	Completion Date	Invoice Paid Date
	NLSB-155	OSTM Environments Effort	04/25/2005	09/30/2005
	NLSB-165	Parametric Study for Loads	08/30/2005	07/27/2005
	NLSB-165R1	Parametric Study for Loads	11/10/2005	11/02/2005
	NLSB-177R1	Passive Isolation Sys	01/17/2006	03/15/2006
	NLSB-177R2	Passive Isolation Sys	02/17/2006	03/27/2006
	NLSB-195R2	CLA for Passive Isolation Sys	06/16/2006	07/17/2006
	NLSB-225	MECO Loads Analysis	7/24/2006	09/15/2006
	NLSB-229	Spacer for Isolation System	8/31/2006	09/20/2006
	NLSB-235	Inert DPAF Proposal Prep	04/14/2006	09/11/2006
	NLSB-242	PAF Pre-production review	11/29/2006	11/20/2006
	NLSB-248	Passive Isolation System to PDR (Phase 1)	04/09/2007	06/21/2007
	NLSB-266	Isolation System Engineering Development Unit (EDU) Fabrication	3/28/07	06/21/2007
	NLSB-272	Payload Isolation System Implementation	07/15/2008	
	NLSB-293	OSTM Ground Support Equipment Task Plan Proposal Cost.	06/15/2007	08/13/2007
	NLSB-298	OSTM Payload Attach Fitting and Clampband inspection	08/08/2007	
Contract Mod (PPF)	Number	Description		•
	WCCPP-001	Commercial PPF (TO# NNK07LA87D)		
There are no Other Contrac	t Mods			
Issues				
G Contract modi	fication for Onboard Car	nera Non Standard Service is in work		

LSP Internal Use Only Sensitive but unclassified



## OSTM - Safety and Mission Assurance

Homero Hidalgo

### LAUNCH SERVICES PROGRAM Evidence of Completion Assurance Verification Areas Status In Work Complete Aug Sep Oct Quality Y $\checkmark$ Software / Hardware Problems Continuing to monitor ULA-Boeing's response to Quality Management System risk, and possible OAD reinstallation $\checkmark$ SMA is tracking no GIDEP issues at this time Alerts $\checkmark$ Audits/Inspections/Surveillances SMA Quality is continuing to selectively perform surveillances and audits $\checkmark$ Limited Life Items SMA is tracking no LLI issues at this time Reliability V FMEA/Fishbones/Equivalent No issues. $\overline{\mathbf{v}}$ Reliability Assessments No issues. Safety $\overline{\mathbf{v}}$ Requirements Definitions Using Calipso tailoring: Range & SMA accepted V No issues. Range Safety & Mission Flight Rules $\checkmark$ Licenses/Use Authorizations No issues. $\overline{\mathbf{v}}$ No issues. Safety Documentation $\overline{\mathbf{v}}$ Non-compliances Waiver submitted for propulsion system, similar to Calipso S/C $\overline{\mathbf{v}}$ Contingency Planning No issues. Y Y Y Mission Assurance $\checkmark$ Lessons Learned No issues. V First Flight/Mission Unique items Softride implementation, 1st use V Test/Qualification/Certification No issues. $\checkmark$ Mission Assurance Assessments Alenia 2nd-Stage Oxidizer Leak, inspection process ID; **ULA transition** $\checkmark$ Risk Management No issues.



# OSTM Comm & Telemetry

Mike Patton and Alex Biamonte

### LAUNCH SERVICES PROGRAM

### Communications

Voice Comm

Data Comm

Networks

Video Comm

Timing

RF Comm

LSSP Comm Annex

Aug	Sep	Oct
G	G	G
G	G	0
G	G	0
G	G	0
G	G	0
G	G	0
G	G	0
G	G	0

### Telemetry

Decommutation Tables

Data Integrity Test

Software Lockdown

Software Inventory

Console Configuration

Console Checkout

Aug	Sep	Oct
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0



# Kepler Project Summary

LAUNCH SERVICES PROGRAM Mission Kepler 2009/02/01 (NET) Launch Date Sep Oct Aug Launch Vehicle Delta II OVERALL MISSION 0 Launch Period Window Commercial PPF PPF MISSION MANAGEMENT Sep Oct LAUNCH SITE Sep Oct SAFETY & MISSION ASSURANCE Sep Oct Aug Observatory Status LSSP Mission Assurance Manifest/Range Customer Inputs Safety Integrated Schedule PPF Quality ICD Launch Site Unique Reliability CDRLs (S/C & LSC) 0 0 Spacecraft OPS **BUSINESS ENGINEERING** COMM & TELEMETRY Budget Launch Vehicle Communications Contracts Mission Specific Telemetry 0 0 0 Certification 0 0 Mission Analysis LEGEND ERS/ERB Proceeding on Plan Launch PAD/GSE Area of Concern Mission Unique IV&V 0 0 Significant Problem R Not Evaluated 0 DOWNRANGE TELEMETRY Not Applicable N/A Ground Stations 0 0

0

0

0

0

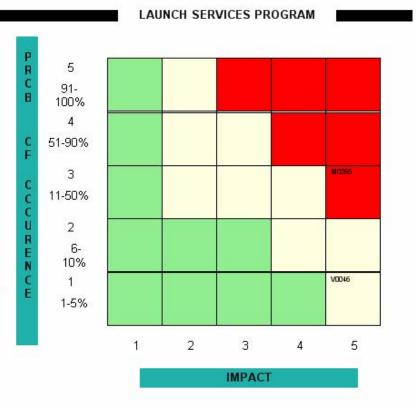
Deployables

P-3/OTTR



# Kepler - Open/Accepted Risks

		Condition
RYG Trend	RiskID	Consequence
microscopic cracks (micro crac spacecraft customer with a Tes Fitting (TPAF) or clampband.  Propagation of a micro crack(s clampband during shock or vibr		ULA/Boeing does not perform an inspection for microscopic cracks (micro cracks) before providing a spacecraft customer with a Test Payload Attach Fitting (TPAF) or clampband.
		Propagation of a micro crack(s) in the TPAF or clampband during shock or vibration testing could cause damage to the spacecraft.
tr		A signed MOA and Host Tenant Agreement (HTA) for transition of SLC-17 Delta-II assets from Air Force to NASA does not currently exist.
979		Without signed MOA and HTA, there will no way to quantify cost of O&M for the Kepler Mission.





# Kepler - Actions / Issues / Concerns

### LAUNCH SERVICES PROGRAM

Mission Summary Map	G/Y/R	ACTIONS	WI/ERS/Risk/ Problem	Open Date	Due Date
Engineering	0	S/C considering not using the ULA ITA and doing the analysis internal to Ball.	VVI	05/15/2007	12/31/2007

Mission Summary Map	G/Y/R	ISSUES / CONCERNS	WI/ERS/Risk/ Problem	Open Date	Due Date
Engineering	0	High gain antenna design change moved location into negotiable envelope below sep pane	WI	Jun-06	09/30/2006



# Kepler - Significant Events

### LAUNCH SERVICES PROGRAM

Accomplished	
TPAF use TA on contract near term	
Received and negotiated TPAF build proposal	
Revised FY06 funding profile to assist project with 2nd Qt shortfall	
Received updated IRD	March 2006-03/03/2006
Completed LSP IRD ERB	03/20/2006
Kepler CDR	04/18/06-04/20/06
ATP planned with November 2008 launch	Nov 2006-11/01/2006
S/C to deliver updated IRD prior to ATP	Aug 2006
Kepler Delta CDR	10/16/06-10/20/06
TA in work to determine Boeing approval of S/C use of "to be negotiated" area below sep plane. Received preliminary approval from Boeing in Aug.	08/01/2006
Boeing support/training for TPAF at Ball facility	10/02/2006-10/11/2006
Provide some of the flight connectors to support Kepler Cable build schedule.	12/15/2006-12/15/2006
Received Kepler FEM to support third CLA analysis and forwarded to Boeing (Contract Mod still in work)	09/11/2006-09/13/2006
S/C to deliver thermal model for ITA, canceled activity	12/22/2006-03/09/2007
MIWG planned for Nov 16	11/16/2006-11/16/2006
GOWG on Jan 19 at Astrotech, titusville	01/18/2007
Delivered updated Kepler IRD	02/05/2007-02/07/2007
planning kick-off MIWG, April 5 in HB	02/08/2007-04/52007

Planned			
MIWG/GOWG at KSC on 23-24 October	08/14/2007- 10/25/2007		

ULA to deliver final set of GSE connectors to S/C	02/01/2007-02/23/2007
Draft ICD released for review	03/31/2007-4/31/2007
S/C delivered IGES files as input to Mission Compatibility. Delivered to LSC	02/14/2007-03/02/2007



### Kepler Mission Management

Dave Breedlove

#### LAUNCH SERVICES PROGRAM

### Mission

Launch Date

Orbit Requirement

Launch Vehicle Class Launch Period Window PPF

Mass (kg)

PAD

Kepler
2009/02/01 (NET)
0.4 km2/sec2, Earth railing heliocentric
Delta II
Commercial PPF
903 kg / L
Other

Observatory Status
Observatory Statu
Schedule
Budget
Deliverables
Testing
ATLO
Instrument

Aug	Sep	Oct
Y	6	6
Υ	0	6
G	6	G
6	6	6
G	6	6
G	6	6
G	8	G

Program:
РМ
LVI
ММ
IE
LSIM
PIM

MAM MCE MTE

Mission Center:

20020-00-042-02-04-0000	
Dave Breedlove	ē
Larry Craig	
Mike Miller	
Harold Coleman	1
Craig Schreiber	é
Tuan Doan	
José Amador, Ph	D

JPL

Leslie Livesay Pete Darus

# Kepler

	Aug	Sep	Oct	
ICD	6	0	G	
There are no signed SCNs	The Rev		no SCN	Vs in

<u>Launch Vehicle</u> Status
Integrated Schedule
CDRLs (S/C & LSC)
M ': f 4/D

Manifest/Range
Ground Stations
Deployables
P-3/OTTR

G	G	G
G	G	G
Υ	G	G
0	0	0
0	0	0
0	D	0



## Kepler - Engineering

Larry Craig

	Aug	Sep	Oct
Launch Vehicle	G	G	G
Payload Fairing	G	G	G
First Stage	G	G	G
Second Stage	G	G	G
Third Stage	G	G	G
Payload Attach Fitting	G	G	G
Other	0	0	0
Mission Specific	G	G	G
Certification	0	0	0
Mission Analysis	G	G	G
ERS/ERB	G	G	G
Launch PAD/GSE	G	G	G
Mission Unique IV&V	0	0	0

	100
NUMBER OF	0
REQUIREMENTS	
VERIFIED TO DATE	0

LAUNCH PAD I GSE MODS (IF APPLICABLE)			
IRD has requirement to use GN2 purge similar to MAP			

MISSION UNIQUE STUDIES (IF APPLICABLE)	
Clampband Interface Line Load Study	



## Kepler - Mission ERB Status

Larry Craig

9			ERB	Req?		Board I	teld?		Closure	
R/Y/G	ERS#	TITLE	Υ	N	Υ	N	N/A	Al	ENG.	OCE
0	05-379	Kepler IRD			V			N	N	



## Kepler - Vehicle ERB Status

Larry Craig

IA	IINC	HC	FDV/	ICES	PPA	GRAI
1 4	UNC		I I I		FRU	UKAI

There are no Vehicle ERBs for this mission.



## Kepler - Launch Site

Mike Miller

LAUNCH SERVICES PROGRAM

Aug Sep Oct

G G G

LSSP	Planned	Released
Preliminary	11/16/07	
Baseline	09/09/08	

**UNIQUE REQUIREMENTS** 

LAUNCH SITE UNIQUE

PPF

Spacecraft OPS



0 0 0

Operational Plans



## Kepler - Business

Harold Coleman

#### LAUNCH SERVICES PROGRAM

Budget Contracts

Aug	Sep	Oct
G	G	G
G	G	G

Milestone	Date
Milestone #1	12/04/2006
Milestone #2	03/06/2007
Milestone #3	07/09/2007
Milestone #4	08/01/2007
Milestone #5	11/01/2007
Milestone #6	02/01/2008
Milestone #7	05/01/2008
Milestone #8	08/01/2008
Milestone #9	11/01/2008

	Open Milestone Payment
	Paid Milestone
- 6	

		Contract Status	
Launch Services			3
Contract Mod	Number	Description	9
	100	NSS 20.3.3/Quick Turnaround CLA	
	152	NSS 20.3.2 Preliminary Performance/Trajectory Analysis	
	178	NSS 20.3.4 Final Design Load Cycle	
	125	NSS 33.1 Post Production Support CY05 (flyout)	
	229	KEPLER Test Payload Attach Fitting (PAF)	2
	242	NSS 20.2 Early MIWG NSS 20.3.2 Preliminary Performance/Trajectory Analysis NSS 20.3.3 Quick Turnaround Coupled Loads Analysis	
	125	NSS 30.1 Long-lead Mat'l/Adv NSS 33.1 Post Prod Spt (FY05)	
	255	CLIN 21 Kepler Basic Launch Service	
	255	NSS 2.1.1 Replace 10-ft w/10L PLF	

Contract Mod	Number	Description	Description			
	255	NSS 20.1 Pedigree Review				
	255	NSS 20.3.4 Final Design Load Analysis	NSS 20.3.4 Final Design Load Analysis			
	255	NSS 9.1.2 Two 61-pin connectors				
	255	NSS 2.1.2 Replace 9ft Fairing with 10ft Fairing				
	0272	Cancel NSS 20.3.2 Preliminary Performance/Traject	Cancel NSS 20.3.2 Preliminary Performance/Trajectory Analysis			
	255	ATP Mission				
	240	NSS 32.1 VAFB Launch Site O&M and NSS 33.1 P	ost Production Support			
There are no LD Contract I						
Task Assignments	Number	Description	Completion Date	Invoice Paid Date		
	NLSB-210R1	TPAF Support	11/1/2006	01/17/2007		
	NLSB-221	TA NLSB-254 HGA Relocation Evaluation	09/15/2006	09/20/2006		
	NLSB-253	Additional Integrated Thermal Analysis.	03/01/2007			
	NLSB-286	Kepler Line-Load Analysis	06/08/2007			
There are no PPF Contrac There are no Other Contra						
Thoro are no locus						
There are no Issues.						



### Kepler - Safety and Mission Assurance

Craig Schreiber

#### LAUNCH SERVICES PROGRAM Evidence of Completion Assurance Verification Areas Status Complete In Work Aug Sep Oct Quality $\checkmark$ Software / Hardware Problems 0 No Activity 0 0 $\checkmark$ 0 Alerts No Activity 0 0 V Audits/Inspections/Surveillances No Activity 0 0 0 V Limited Life Items No Activity 0 0 0 Reliability $\overline{\mathbf{v}}$ FMEA/Fishbones/Equivalent No Activity 0 0 0 V Reliability data gathering in work (No issues as of Reliability Assessments 9/11/06) Safety $\overline{\mathbf{v}}$ 0 0 Requirements Definitions V Range Safety & Mission Flight Rules No issues 0 0 $\overline{\mathbf{v}}$ No issues 0 Licenses/Use Authorizations 0 $\overline{\mathbf{v}}$ 0 Safety Documentation No issues 0 $\overline{\mathbf{v}}$ Non-compliances No status 0 0 0 $\checkmark$ Contingency Planning No status 0 0 0 Mission Assurance V Lessons Learned No activity 0 0 0 $\checkmark$ 0 0 0 First Flight/Mission Unique items no activity $\overline{\mathbf{v}}$ Test/Qualification/Certification No activity 0 0 0 $\checkmark$ No activity 0 Mission Assurance Assessments 0 0 $\checkmark$ Risk Management No activity 0 0 0

### Kepler Comm & Telemetry

Tuan Doan and José Amador, PhD

#### LAUNCH SERVICES PROGRAM

#### Communications

Voice Comm

Data Comm

Networks

Video Comm

Timing

RF Comm

LSSP Comm Annex

Aug	Sep	Oct
a	G	G

	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
G	G	G
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
	100	

#### Telemetry

Decommutation Tables

Data Integrity Test

Software Lockdown

Software Inventory

Console Configuration

Console Checkout

Aug	Sep	Uct
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0



### **Aquarius Project Summary**

#### LAUNCH SERVICES PROGRAM Mission Aquarius 2009/07/14 Launch Date Sep Oct Aug Launch Vehicle Delta II OVERALL MISSION 0 Launch Period Window Commercial PPF PPF MISSION MANAGEMENT Aug Sep Oct LAUNCH SITE Sep Oct SAFETY & MISSION ASSURANCE Sep Oct Aug Aug Observatory Status 0 LSSP Mission Assurance 0 0 0 Manifest/Range Customer Inputs 0 Safety 0 0 0 Integrated Schedule PPF 0 Quality 0 0 0 ICD Launch Site Unique N/A 0 Reliability 0 0 0 CDRLs (S/C & LSC) Spacecraft OPS D BUSINESS **ENGINEERING** COMM & TELEMETRY Budget Launch Vehicle 0 Communications Contracts Mission Specific Telemetry 0 0 0 0 Certification N/A N/A Mission Analysis 0 LEGEND ERS/ERB 0 Proceeding on Plan Launch PAD/GSE 0 Area of Concern Mission Unique IV&V 0 0 Significant Problem R Not Evaluated 0 DOWNRANGE TELEMETRY Not Applicable N/A Ground Stations 0 0

0

0

0

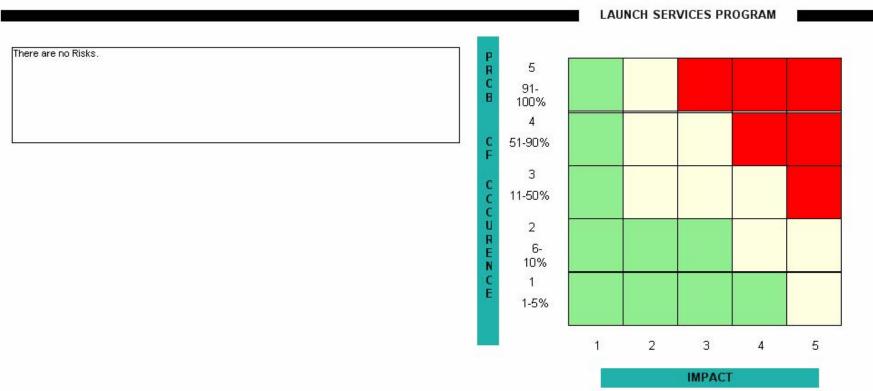
0

Deployables

P-3/OTTR



### Aquarius - Open/Accepted Risks





## Aquarius - Actions / Issues / Concerns

	LAUNCH SERVICES PROGRAM	
24-13		
There are no Actions.		
Controlled State Controlled Contr		

Mission Summary Map	G/Y/R	ISSUES / CONCERNS	WI/ERS/Risk/ Problem	Open Date	Due Date
Mission Management	0	Mission LRD moved to July 09, sill further risk of moving with possible LRD in 2010. Mission LRD planing date now 22 May 2010, FPB action to confirm date by Oct 5, 2007. PMC planned for 30 October at HQ	WI	01/10/2007	11/02/2007
Business	0	Possible increased LV and O&M costs due to proposed LRD in 2010,	WI	09/19/2007	11/30/2007



## Aquarius - Significant Events

Accomplished		
Instrument PDR	06/28/2005-06/30/2005	
Spacecraft PDR	08/03/2005-08/04/2005	
Mission Confirmation Review held	09/28/2005	
Program Intro / Range Concept Briefing at VAFB	12/16/2005	
Quick turnaround CLA	3	
Instrucment CDR at JPL	09/18/2006-09/22/2006	
TFA data delivery	9/11/2006	
Deliver Final SSPP and Initial MSPSP to the Range	09/15/2006	
JPL to perform RF monitoring at SSI and Astrotech	08/30/2006-08/31/2006	

Planned		
ATP with ULA	Nov 2007	
Kick-Off Meeting with ULA	March 2008	
SC CDR	March 2008	
Mission CDR	April 2008	
IRD	07/13/2007- 10/12/2007	
Integrated Schedule	Dec 2007	
Ground Ops/Launch vehicle TIM	October 2007	
Full CLA planned prior to ATP	09/03/2007- 12/10/2007	
PMC on schedule re-plan on 30 October	09/19/2007- 11/02/2007	
ATP for mission	11/16/2007- 11/16/2007	



### Aquarius Mission Management

Dave Breedlove

#### LAUNCH SERVICES PROGRAM

Mission

Launch Date

Orbit Requirement

Launch Vehicle Class

Launch Period Window

PPF

Mass (kg)

PAD

Aquarius	
2009/07/14	4
Sun Sync	
Delta II	
Commercial F	PPF
SLC-2	

Observatory Status **Observatory Status** 

Schedule

Budget

Deliverables

Testing

ATLO

Instrument

Aug	Sep	Oct
G	8	0
G	Y	0
G	6	6
G	6	0
G	6	0
G	6	0
6		0

PM.

LVI

MAM

MTE

Mission Center:

Program:

IE

MM

LSIM

PIM

MCE

JPL **ESSP** 

Amit Senn Mike Davis

Dave Breedlove Armando Piloto Tricia Fertig

Benjamin Studenski Michael Johnson

Robert McEntire Nathan Wood

AOUARIUS

	Aug	Sep	Oct
ICD	0	N/A	0

There are no signed	There are no SCNs in	
SCNs	Review	

#### Launch Vehicle Status

Integrated Schedule CDRLs (S/C & LSC)

Manifest/Range

**Ground Stations** Deployables

P-3/OTTR

G	G	0
G	G	0
0	G	0
0	0	0
٥	0	0
D	0	0



## Aquarius - Engineering

Armando Piloto

	Aug
Launch Vehicle	G
Payload Fairing	G
First Stage	G
Second Stage	G
Third Stage	G
Payload Attach Fitting	G
Other	G
Mission Specific	G
Certification	N/A
Mission Analysis	G
ERS/ERB	G
Launch PAD/GSE	G
Mission Unique IV&V	0

Aug	Sep	Oct
G	G	0
G	G	0
G	G	0
G	G	0
G	N/A	0
G	6	0
G	G	0
G	6	0
N/A	N/A	0
G	6	0
G	G	0
G	G	0
0	0	0

REQUIREMENT VERIFICATION STATUS		
NUMBER OF REQUIREMENTS	0	
VERIFIED TO DATE	o	

LAUNCH PAD I GSE MODS (IF APPLICABLE)				
Launch PAD sustainment support into 2010				

MISSION UNIQUE STUDIES (IF APPLICABLE)	
There are none.	



## Aquarius - Mission ERB Status

Armando Piloto

I ATTAL	CIL	CEDM	CEC	PROGRAM	
LAUN	L-III	SERVI	1.5	PRUGRAM	

There are no Mission ERBs for this mission.



### Aquarius - Vehicle ERB Status

Armando Piloto

LAH	NCH	SFRV	ICES	PRO	GRAN

There are no Vehicle ERBs for this mission.



## Aquarius - Launch Site

Tricia Fertig

LAUNCH SERVICES PROGRAM

	Aug	Sep	Oct
LSSP	G	G	G

LSSP	Planned	Released
Preliminary	3/2008	
Baseline	9/2008	

	Aug	Sep	Oct
CUSTOMER INPUTS	G	G	G
DELIVERABLES	Aug	Sep	Oct
Security and Badging	G	G	G
Training and Personnel Cert	G	G	G
Contingency Plans	G	G	G
Safety LSIM	G	G	G
Radiation Control	G	G	G
Operational Plans	G	G	G

#### UNIQUE REQUIREMENTS

	Aug	Sep	Oct
LAUNCH SITE UNIQUE	G	G	G
Propellant Services	G	G	G
PPF	G	G	G
Spacecraft OPS	G	G	G

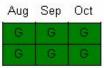


### Aquarius - Business

Benjamin Studenski

#### LAUNCH SERVICES PROGRAM

Budget Contracts



Milestone	Date	
Milestone 1	04/14/2007	
Milestone 2	07/14/2007	
Milestone 3	10/14/2007	
Milestone 4	01/14/2008	
Milestone 5	04/14/2008	
Milestone 6	07/14/2008	
Milestone 7	10/14/2008	
Milestone 8	01/14/2009	
Milestone 9	04/14/2009	
Milestone: 10	07/14/2009	

		Contract Status		
Launch Services				
Contract Mod	Number	Description		
	NLSB 219	NSS 20.2.3 Early Trajectory Analysis		
	NLSB 201	NSS 20.3.3 Quick Turnaround CLA		
Contract Mod (LD)	Number	Description		
	076	Delay from 9/07 to NET 3/1/08		
	136	Delay from 3/08 to 9/08		
	235	Delay from 9/30/08 to 3/23/09		
	264	Delay from 3/23/09 to 7/14/2009		
Task Assignments	Number	Description	Completion Date	Invoice Paid Date
	NLSB 178	Range Introduction meeting support	12/16/2005	01/06/2006
	NLSB 180	Accelerated Time Histories	03/10/2006	04/07/2006
	NLSB 197	Pre-ATP Support (export docs, travel)	4/30/2007	
	NLSB 208	Pre-ATP Shipping	02/28/2007	
There are no PPF Contract Mods	3			
Contract Mod (Other)	Number	Description		
	NLSB 125	NSS 30.1 FY05 Flyout Costs		
Issues				
Y New launch date no	eeded. Current launch	date on contract is 7/14/2009.		
Y First Delta II launch	n in 2010. Launch Pad	maintenance cost and Post-production support costs are cu	ırrently not fully k	nown



### Aquarius - Safety and Mission Assurance

Michael Johnson

#### LAUNCH SERVICES PROGRAM Evidence of Completion Assurance Verification Areas Status Complete In Work Oct Aug Sep 0 0 Quality $\checkmark$ Software / Hardware Problems None mission specific at this time 0 0 0 $\checkmark$ Alerts Will be continuously reviewed 0 0 $\checkmark$ Audits/Inspections/Surveillances Will be continuously reviewed 0 0 0 V Limited Life Items Identified later in campaign 0 0 0 Reliability 0 0 0 $\overline{\mathbf{v}}$ FMEA/Fishbones/Equivalent 0 0 0 V Reliability Assessments 0 0 0 Safety 0 0 0 V Requirements Definitions TBD 0 0 0 $\overline{\mathbf{v}}$ Range Safety & Mission Flight Rules TBD 0 0 0 V TBD 0 0 Licenses/Use Authorizations 0 $\checkmark$ Safety Documentation TBD 0 0 0 $\checkmark$ Non-compliances TBD 0 $\overline{\mathbf{Z}}$ TBD 0 0 0 Contingency Planning **Mission Assurance** 0 0 0 $\checkmark$ TBD 0 0 0 Lessons Learned $\checkmark$ TBD 0 First Flight/Mission Unique items 0 0 $\checkmark$ 0 Test/Qualification/Certification TBD 0 V Mission Assurance Assessments TBD 0 0 0 $\checkmark$ TBD 0 Risk Management



### Aquarius Comm & Telemetry

Robert McEntire and Nathan Wood

#### LAUNCH SERVICES PROGRAM

#### Communications

Voice Comm

Data Comm

Networks

Video Comm

Timing

RF Comm

LSSP Comm Annex

, ,49	Och	001
G	G	G
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
	72	

0

0

Aug Sen Oct

#### Telemetry

**Decommutation Tables** 

Data Integrity Test

Software Lockdown

Software Inventory

Console Configuration

Console Checkout

Aug	Sep	Oct
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0



### WISE Project Summary

John F. Kennedy Space Center

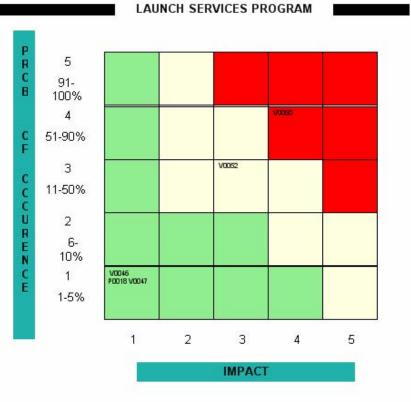
LAUNCH SERVICES PROGRAM WISE Mission 2009/11/01 Launch Date Sep Oct Aug Launch Vehicle Delta II **OVERALL MISSION** Launch Period Window Any day of year PPF Commercial PPF MISSION MANAGEMENT Sep Oct LAUNCH SITE Sep Oct SAFETY & MISSION ASSURANCE Sep Oct Aug Aug Observatory Status LSSP Mission Assurance Manifest/Range Customer Inputs Safety Integrated Schedule PPF Quality ICD Launch Site Unique Reliability CDRLs (S/C & LSC) Spacecraft OPS **BUSINESS ENGINEERING** COMM & TELEMETRY Budget Launch Vehicle Communications Contracts Mission Specific Telemetry 0 0 0 Certification Mission Analysis LEGEND ERS/ERB Proceeding on Plan Launch PAD/GSE Y Y Area of Concern Mission Unique IV&V N/A N/A Significant Problem R Not Evaluated 0 DOWNRANGE TELEMETRY Not Applicable N/A Ground Stations Deployables

P-3/OTTR



### WISE - Open/Accepted Risks

		Condition
RYG Trend	RiskID	Consequence
G	V0046	ULA/Boeing does not perform an inspection for microscopic cracks before providing a spacecraft customer with a test payload attach fitting (TPAF) or clampband.
		Propagation of a micro crack(s) in the TPAF or clampband during shock or vibration testing could cause damage to the spacecraft.
G	V0052	LS SMA has noted human error and process issues that indicate that Boeing's quality management system corrective actions are not preventing reocurrence.
		The re-occurrence of undetected human errors and process problems can lead to major damage or loss of flight hardware or GSE.
G	V0050	Dawn experienced a significant delay very late in the hardware production process that delayed the launch readiness date. The same contributing causes exist for other NASA missions.
		Possible delay of other NASA missions.
c	P0018	Traditional DMCO Testing (Bldg AO on CCAFS) on Commercial and NASA Delta II launch vehicles will be eliminated. Required testing that has historically been performed in DMCO will be transferred to the launch pad as part of the "DMCO On-Pad Initiative."
G		Elimination of traditional DMCO Testing will not allow for capturing hardware failures off-pad, and thus introduce potential for on-pad schedule delays of more than one key milestone if hardware fails during pad testing.



G	∨0047	Failure analysis of a Pacific Scientific PN 107800- 201detonator (SN 4498) that failed service life extension testing uncovered a manufacturing process vulnerability in which detonators could be reworked and inadvertently returned to production without the correct load of explosive material.
		Failure to initiate FTS destruct ordnance chain on command.



### WISE - Actions / Issues / Concerns

100

Mission Summary Map	G/Y/R	ISSUES / CONCERNS	WI/ERS/Risk/ Problem	Open Date	Due Date
Mission Management	G	The study for hydrogen safety vent stack and cryogenic GSE logistics at SLC-2W has been initiated with a 3 mo POP beginning 8/9/07. Item will continue to be monitored closely due to it's criticality.	WI	07/16/2007	11/30/2007
Engineering	G	ULA/Boeing does not perform an inspection for microscopic cracks beforeproviding a spacecraft customer with a test payload attach fitting (TPAF)or clampband. Propagation of micro cracks in the TPAF or clampband during shock or vibrationtesting could cause damage to the spacecraft.	Risk V0046	8/31/07	
Engineering	G	LS SMA has noted human error and processing issues that indicate that Boeing's quality management system corrective actions are not preventing re-occurence. The re-occurence of undetected human errors and process problems can lead to major damage or loss of lfight hardware or GSE.	Risk V0052	8/31/07	
Engineering	G	DAWN experienced a significant delay very late in the hardware production process that delayed the launch readiness date. The same contributing causes exist for other NASA missions. Possible delay for other NASA missions.	Risk V0050	8/31/07	
Engineering	G	Traditional DMCO Testing (Bldg AO on CCAFS) on Commercial and NASA Delta II launch vehicles will be eliminated. Required testing that has historically been performed in DMCO will be transferred to the launch pad as part of the "DMCO On-Pad Initiative." Elimination of traditional DMCO testing will not allow for capturing hardware failures off-pad, and thus introduce potential for on-pad schedule delays of more than one key milestone if hardware fails during pad testing.	Risk P0018	8/31/07	

Mission Summary Map	G/Y/R	ISSUES / CONCERNS	WI/ERS/Risk/ Problem	Open Date	Due Date
Engineering	G	Failure analysis of a Pacific Scientific PN 107800-201 detonator (SN 4498) that failed service life extension testing uncovered a manufacturing process vulnerability in which detonators could be reworked and inadvertently returned to production without the correct load of explosive material. Failure to initiate FTS destruct ordnance chain on command.	Risk V0047	8/30/07	



## WISE - Significant Events

Accomplishe	ed
Quick turn around CLA on contract	Mar 06
S/C Questionnaire transmittal to ULA.	10/31/2007
Early MIWG/GOWG	Nov 06
Confirmation Review	Oct 06
Authority To Proceed (ATP) w/27 mo integration cycle.	08/01/2007
S/C CDR	4/3/07
Mission CDR	06/20/2007
PRCB for ATP Concurrence	07/27/2007
Kickoff MIWG	10/3/07
Mission Turn On ERB	7/31/07-7/31/07

Planned	1
Hydrogen and Cryo GSE study	08/09/2007- 11/09/2007



## WISE Mission Management

Armando Piloto

#### LAUNCH SERVICES PROGRAM

#### Mission Launch Date

Orbit Requirement

Launch Vehicle Class Launch Period Window PPF

Mass (kg) PAD

WISE
2009/11/01
725km sun sync 6 am or pm ascending node
Delta II
Any day of year
Commercial PPF
1387
SLC-2

Observatory Status
<u> </u>
Observatory Status
Schedule
Budget
Deliverables
Testing
ATLO
Instrument

Aug	Sep	Oct
6	8	G
6	G	G
G	G	G
6	6	G
6	6	6
Υ	G	G
G	6	G

Program:
PM
LVI
ММ
IE
LSIM
PIM
MAM
MCE
MTE

Mission Center:

Armando Piloto Jim Hoffman Jeffrey Ehrsam Harold Coleman Homero Hidalgo
Jeffrey Ehrsam Harold Coleman
Harold Coleman
2010 000000 000
Homero Hidalgo
1000 March
Tuan Doan
José Amador, PhD

**JPL** 

Explorer

Bill Irace



	~ug	oep	001	
ICD	G	6	G	
There are no signed SCNs	The Rev		no SCNs	in

<u>Launch Vehicle</u> <u>Status</u>
Integrated Schedule
CDRLs (S/C & LSC)
Manifest/Range
Ground Stations
Deployables

P-3/OTTR

G	G	G
G	G	G
G	G	G
G	G	G
G	G	G
G	G	G



### WISE - Engineering

Jim Hoffman

#### LAUNCH SERVICES PROGRAM

	Aug	Sep	Oct
Launch Vehicle	G	G	G
Payload Fairing	G	G	G
First Stage	G	G	G
Second Stage	G	G	G
Third Stage	N/A	G	N/A
Payload Attach Fitting	G	G	Υ
Other	N/A	N/A	N/A
Mission Specific	G	G	G
mission specific	100		.0
Certification	G	G	G
	1000	1000	1000
Certification	G	G	G
Certification Mission Analysis	G G	G	G G

REQUIREMENT VERIFIC	ATION STATUS
NUMBER OF REQUIREMENTS	0
VERIFIED TO DATE	0

# LAUNCH PAD / GSE MODS (IF APPLICABLE) Evaluating the pad impacts of servicing the S/C Hydrogen Cryostat

MISSION UNIQUE STUDIES (IF APPLICABLE)

Evaluating methods to reduce the high lateral loads CLA results



#### WISE - Mission ERB Status

Jim Hoffman

			ERB	Req?	9	Board I	teld?		Closure	
R/Y/G	ERS#	TITLE	Υ	N	Υ	N	N/A	Al	ENG.	OCE
G	ERS-07-186	Mission Turn-on ERB	N		N			$\square$	☑	
G	ERS-07-272	Mission ICD ERB	N			$\square$				



#### WISE - Vehicle ERB Status

Jim Hoffman

IA	IINC	HC	FDV/	ICES	PPA	GRAI
1 4	UNC		I I I		FRU	UKAI

There are no Vehicle ERBs for this mission.



#### WISE - Launch Site

Jeffrey Ehrsam

LAUNCH SERVICES PROGRAM

Aug Sep Oct

LSSP G G G

LSSP	Planned	Released
Preliminary	07/01/2008	
Baseline	06/01/2009	

#### UNIQUE REQUIREMENTS

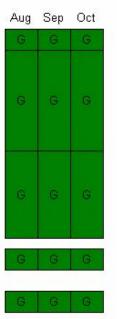
#### LAUNCH SITE UNIQUE

Two 500liter dewars of liquid helium to be replaced every day on Level 5 at SLC-2. May require Level 5 modifications. JPL not satisfied with speed of Task Order procurement between ULA and KSC.

Design/Install hydrogen vent stack at PPF, SLC-2 MST and Boeing Can. JPL not satisfied with speed of Task Order procurement between ULA and KSC.

PPF

Spacecraft OPS





### WISE - Business

#### Harold Coleman

LAUNCH	SERVICES
PRO	GRAM

Open Milestone Payment

Paid Milestone

Budget Contracts

Aug	Sep	Oct
G	G	G
G	G	G

Milestone	Date
Milestone 1	09/26/2007
Milestone 2	
Milestone 3	
Milestone 4	
Milestone 5	
Milestone 6	
Milestone 7	
Milestone 8	
Milestone 9	

Contract Status				
Launch Services				
Contract Mod	Number	Description		
	NLSB-60	12/11/02 FPB directed change in MIDEX-6 (CLIN 25) Vehicle config. From 2420-10 to 2425-10		
	NLSB-191	8/26/05 FPB directed the renaming of CLIN 25 from MIDEX-6 to "WISE"; establishment of the launch site as VAFB; and change of vehicle config. From 2425-10 to 2320-10		
	NLSB-214	NSS 20.3.3 Early CLA		
	NLSB-236	12/6/2005 FPB directed change to WISE Launch Date from 3/31/08 to 6/14/09		
	NLSB-242	NSS 20.2 Early MIWG		
	NLS-B 257	NSS 20.3.4 Final Design Load Cycle		
	NLSB-265	Adjust launch date from June 14, 2009 to November 1, 2009.		
	295	ATP Mission		
	295	NSS 30.2 Long Lead Material Liquidation Credit		
	295	NSS 2.2.3 Additional 42-inch diameter door		

Contract Mod	Number	Description		
	295	NSS 3.1.3 3715C Payload Adapter		
	295	NSS 35.2 Additional 40 Mission Console Notebooks		
	295	NSS 20.1 Pedigree Review		
	295	NSS 27.1 Western Range (WR) Launch Incremental		
	125	NSS 30.1 Long-lead Mat'l/Adv NSS 33.1 Post Prod Support		
	240	NSS 32.1 VAFB Launch Site O&M and NSS 33.1 Post Production		
There are no LD Contract I				
Task Assignments	Number	Description	Completion Date	Invoice Paid Date
	NLSB-0299	Hydrogen safety vent stack study and cryogenic GSE logistics on the SLC-2 mobile service tower	11/10/2007	
	NLSB-304	37-Pin electrical connectors	10/04/2007	
There are no PPF Contrac		•	•	
There are no Other Contra	ct Mods			
There are no Issues.				



## WISE - Safety and Mission Assurance

Homero Hidalgo

#### LAUNCH SERVICES PROGRAM Evidence of Completion Assurance Verification Areas Status In Work Complete Aug Sep Oct Quality Y $\checkmark$ Software / Hardware Problems Continuing to monitor ULA-Boeing's response to Quality Management System risk, and possible OAD reinstallation $\checkmark$ SMA is tracking no GIDEP issues at this time. Alerts Audits/Inspections/Surveillances SMA Quality is continuing to selectively perform surveillances and audits $\checkmark$ Limited Life Items SMA is tracking no LLI issues at this time Reliability V FMEA/Fishbones/Equivalent $\overline{\mathbf{v}}$ Reliability Assessments 0 Safety $\square$ Requirements Definitions No Issues at this time $\overline{\mathbf{v}}$ Range Safety & Mission Flight Rules No Issues at this time $\checkmark$ Licenses/Use Authorizations No Issues at this time $\overline{\mathbf{v}}$ No Issues at this time Safety Documentation $\checkmark$ Non-compliances No Issues at this time V Contingency Planning No Issues at this time Y Y Y Mission Assurance V No Issues at this time Lessons Learned $\checkmark$ First Flight/Mission Unique items Cryo Vent Stack & GSE study in progress $\checkmark$ Test/Qualification/Certification No Issues at this time $\checkmark$ Mission Assurance Assessments Alenia 2nd-Stage Oxidizer Leak, inspection process ID; **ULA transition** V Risk Management No Issues at this time



# WISE Comm & Telemetry

Tuan Doan and José Amador, PhD

#### LAUNCH SERVICES PROGRAM

## Communications

Voice Comm

Data Comm

Networks

Video Comm

Timing

RF Comm

LSSP Comm Annex

۸ug	Sep	Oct

-1600 CT <del>T</del>	145777557	
G	G	G
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
	0.4	17

## Telemetry

**Decommutation Tables** 

Data Integrity Test

Software Lockdown

Software Inventory

Console Configuration

Console Checkout

2000 S.T.		
0	0	0
0	0	0
0	0	0

Aug Sep Oct

U		0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0



## OCO Project Summary

John F. Kennedy Space Center

#### LAUNCH SERVICES PROGRAM oco Mission 2008/12/15 Launch Date Sep Oct Aug Launch Vehicle Taurus **OVERALL MISSION** Launch Period Window TBD PPF TBD MISSION MANAGEMENT Aug Sep Oct LAUNCH SITE Sep Oct SAFETY & MISSION ASSURANCE Sep Oct Aug Observatory Status LSSP Mission Assurance Manifest/Range Customer Inputs Safety Integrated Schedule PPF Quality ICD Launch Site Unique Reliability CDRLs (S/C & LSC) Spacecraft OPS **BUSINESS ENGINEERING** COMM & TELEMETRY Budget Launch Vehicle Communications Contracts Mission Specific Telemetry 0 0 0 Certification Y Mission Analysis LEGEND ERS/ERB Proceeding on Plan Launch PAD/GSE Area of Concern Mission Unique IV&V Significant Problem R Not Evaluated 0 DOWNRANGE TELEMETRY Not Applicable N/A Ground Stations 0 0

0

0

0

0

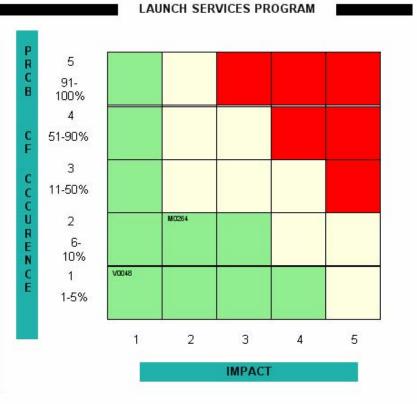
Deployables

P-3/OTTR



# OCO - Open/Accepted Risks

	\$	Condition
RYG Trend	RiskID	Consequence
0	√0048	Failure analysis of a Pacific Scientific PN 107800-201 detonator (SN 4498) that failed service life extension testing uncovered a manufacturing process vulnerability in which detonators could be reworked and inadvertently returned to production without the correct load of explosive material.
		Failure to initiate third stage ignition or FTS destruct ordnance chain on command.
	M0264	The OCO and Glory payload fairing (PLF) production schedules are ahead of the Ballast Ring Mission Unique design reviews. The outcome of the ballast ring design process impacts the location of the PLF doors which are described in the Mechanical ICDs.
0		If the Ballast Ring design changes as an outcome of the design review process the OCO and Glory PLF cutouts (as defined in the MICD change) may not be located in the corrct position to support S/C access after PLF installation. Or, if the MICD is not approved by NASA, cost and schedule of PLF manufacturing may be impacted.





# OCO - Actions / Issues / Concerns

Mission Summary Map	G/Y/R	ACTIONS	WI/ERS/Risk/ Problem	Open Date	Due Date
Engineering	G	OCO Ballast Ring MUPDR identified potential issue of orbital debris survival of the stainless steel weights used to tailor the ballast ring mass. LSP and JSC analysis performed. Need to assess changing material selection of these bolt on mass rings. Telecon planned 9/17/07.	WI	9/17/07	1/31/08

Mission Summary Map	G/Y/R	ISSUES / CONCERNS	WI/ERS/Risk/ Problem	Open Date	Due Date
Engineering	G	S/C Electrical reqmts exceed Taurus umb capability at pad. Orbital LSG developing mod to umbilicals. 2/12/07 GM, received prelim design from Orbital, in eng assessment. 6/13/07 GM ERB scheduled Sep 07. 9/17/07 JBM Sep 07 ERB postponed.	ERS-06-328	05/03/2006	09/28/2007
Engineering	G	Decision on moment arm/dispersion solution due by April 20 per LSG request. Received ROM for Option B and C. Option A elimated by LSP due to S/C insertion dispersion issues. GM, Option C stage 3 ballast SOW sent out to LSG, waiting for proposal. 06/13/07 GM waiting for ATP, MURR scheduled 6/28/07.  Update 7/2/07: Proposal in hand a KSC, ATP by 7/5/07  Update 8/13/07: MURR held 7/12/07. MUPDR held 8/28/07. MUCDR tentatively Jan. 08	WI	03/13/2007	01/31/2008
Mission Management	Y	OCO and Glory are currently manifested for the same month. Parallel integration schedules will cause conflicts with Engineering resources for Orbital LSG to deliver CDRLs, additionally the schedule may cause possible resource issues for OCO spacecraft team with CDRL inputs. 7/2/07: Certification effort further complicating resources for both OCO and Glory mission integration schedules. 7/27/07: No issues w/ analysis products. Hardware processing starting Jan 08 is still a concern.	WI	04/17/2007	12/01/2007
Engineering	Y	OCO Softride is mission unique not covered under generic Taurus cert. SOW initiated to ensure Softride qualification includes proper levels and configurations for OCO/T8, awaiting response. Softride qual is needed prior to planning and use of isolators during spacecraft environmental testing.	WI	7/31/07	11/1/07

Mission Summary Map	G/Y/R	ISSUES / CONCERNS	WI/ERS/Risk/ Problem	Open Date	Due Date
Engineering	G	MICD ICP approval for fairing door location change needed by Aug. 6, 2007. This is before MUPDR and MUCDR. Engineering decided not to approve the ICP at this time due to technical risk of proceeding with fairing manufacturing prior to completing ballast ring design. Risk sheet M0264 is in review. 8/29/07: MICD ICP#3 was signed by KSC for OCO on 8/14/07. MUPDR for Ballast Ring was successfully concluded 8/28/07. 9/17/07 JBM This item will remain open until risk is approved.	RISK M0264	8/13/07	9/13/07
Engineering	G	Manufacturing process vulnerability in which Pacific Scientific detonators that have been reworked may have been inadvertently returned to production without the correct load of explosive material.  Risk accepted for AIM. OCO mission assessments of this Taurus vehicle risk item is ongoing.	RISK V0048	3/23/07	



# OCO - Significant Events

Accomplished	
Contract Mod signed for 09/2008 LRD	
Initiated PCLA	7/2005
MIWG 2	
Range grandfathering approval for EWR 127-1 was received	04/13/2006
MIWG 3	05/05/2006
PCLA Data Review	2/2006
Bus CDR	02/15/2006-02/16/2006
Preliminary ICD Review	
MICD released	01/11/2007
MIssion CDR	08/21/2006-08/24/2006
EICD release	01/23/2007
ICD Peer Review with Integration Engineers.	09/11/2006-09/18/2006
Modified contract to add Umbilical mods, T- O purge and additional isolators for testing.	9/13/2006
TFA to evaluate inclination dispersions	11/20/2006-01/25/2007
MIWG/GOWG at KSC Feb 13-14	02/13/2007-02/14/2007
Payload Safety Working Group meeting at KSC	05/30/2007-05/30/2007
MIWG #4 minutes released	05/16/2007
Mission Unique modification for moment arm issue delivery, evaluation, and ATP, estimated to be 7/5/07	06/01/2007-07/06/2007
Isolator qualification TIM date TBD awaiting CSA to be on contract with LSG	07/02/2007-07/13/2007
MURR scheduled for 12 July 07	07/02/2007-07/12/2007
Mission ICD released	04/12/2007-04/12/2007

Planned	
Launch delay proposal delivery and KSC evalutation completed, estimate for KSC Contracts approval by 8/3/07	06/01/2007- 08/17/2007
Interim CLA to start beginning of Sept, with preliminary data out in early Oct to meet s/c need date	09/03/2007- 10/31/2007
T8/T9 Ballast Ring MUCDR	1/31/08
PMA data delivery	Late Sept.
PPF award	Early Dec. 2007
MIWG/GOWG at VAFB	Mid Dec. 2007
T8/T9 MUSAR	8/28/08

Ballast Ring MUPDR planned for 28 Aug	08/28/2007-08/28/2007
Softride Qualification TIM	TBD-08/08/2007
PMA/Sep analysis inputs from S/C	08/06/2007-08/07/2007
Release of MICD/ ICP for ballast mod update: risk entered to cover MICD change prior to MUCDR	08/06/2007-10/31/2007
Interim CLA data delivery	10/11/2007-10/11/2007



# OCO Mission Management

Dave Breedlove

#### LAUNCH SERVICES PROGRAM

### Mission

Launch Date

Orbit Requirement

Launch Vehicle Class

Launch Period Window

PPF

Mass (kg)

PAD

000
2008/12/15
705 km / 98.2 deg incl
Taurus
TBD
TBD
444 kg (TB
567E

<u>)bservatory</u>	<u>Status</u>
hservaton	Statu

Schedule

Budget

Deliverables

Testing

ATLO

Instrument

Aug	Sep	Oct
G	G	G
6	G	6
G	6	G
G	6	G
G	G	G
G	G	G
G	8	G

## M

Program:

MM

ΙE

LSIM

MTE

liss	ion	Cen	ter:

PM.

LVI

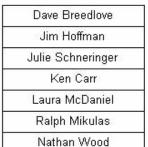
PIM

MAM

MCE

JPL **ESSP** 

Tom Livermore Mike Davis





ICD



## Launch Vehicle Status

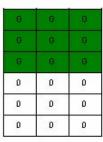
Integrated Schedule CDRLs (S/C & LSC)

Manifest/Range

**Ground Stations** 

Deployables

P-3/OTTR



SIGN	NED SCNS:	SCNS	IN REVIEW														
SCN#	DATE SIGNED	SCN#	DATE SIGNED														
ICP-01. EICD	02/13/2007	ICP-01, Mission	Mission	Mission	Mission	Mission	Mission	Mission	Mission	Mission	Mission	Mission	Mission	Mission	Mission	Mission	
ICP-02, EICD	02/13/2007	ICD ICP-04,															
ICP- 003, MICD	08/14/2007	Mission ICD															
ICP-02, Mission ICD	9/10/07																
ICP-03, Mission ICD	8/28/07																
ICP-05, Mission ICD	9/10/07																
ICP- 001, MICD	9/10/07																
ICP- 002, MICD	8/28/07																



# OCO - Engineering

Jim Hoffman

## LAUNCH SERVICES PROGRAM

	Aug	Sep	Oct
Launch Vehicle	G	G	G
Payload Fairing	G	G	G
First Stage	G	G	G
Second Stage	G	G	G
Third Stage	G	G	G
Payload Attach Fitting	G	G	G
Other	G	G	G
Mission Specific	G	G	G
Certification	Υ	Υ	Υ
Mission Analysis	G	G	G
ERS/ERB	G	G	G
Launch PAD/GSE	G	G	G
Mission Unique IV&V	G	G	G

REQUIREMENT VERIFIC	CATION STATUS
NUMBER OF REQUIREMENTS	127
VERIFIED TO DATE	0

LAUNCH PAD I GSE MODS (IF APPLICABLE)
There are none.

MISSION UNIQUE STUDIES (IF APPLICABLE)

Ballast Ring Orbital Debris Survival



# OCO - Mission ERB Status

Jim Hoffman

7			ERB	Req?	0	Board	Held?	0	Closure	
R/Y/G	ERS#	TITLE	Y	N	Y	N	N/A	Al	ENG.	OCE
G	ERS-06-314	OCO ICD Review	☑		☑					
G	ERS-06-328	OCO Umbilical Harness Modification								
G	06-388	Taurus T8/T9 RCS Moment Arm Issue			☑					
G	07-188	Taurus T8/T9 MURR								
G	07-189	Taurus T8/T9 MUPDR								
G	07-190	Taurus T8/T9 MUCDR	☑			☑				
G	07-191	Taurus T8/T9 MUSAR								
G	ERS-07-27	S/C Shock test (Taurus missions)Using Flight PAF		☑		☑	Ø			
G	ERS-07-173	Taurus T8/T9 Softride Isolators		☑		$\square$	$\square$			



## OCO - Vehicle ERB Status

Jim Hoffman

	¢		ERB	Req?	7	Board	Held?	0	Closure	
R/Y/G	ERS#	TITLE	Y	N	Υ	N	N/A	AI	ENG.	OCE
G	04-460	TVC Lot 10 cap failure Power Board		☑						
G	05-52	SBS/OR Heritage Flight Computer Life Extension	☑			☑				
G	06-140	Taurus XL Stage 1 Nozzle ECL and LEC material change from PAN to Rayon	Ø			Ø				
G	07-69	S&A Failure to Rotate				$\square$				
G	07-76	Orion Motor Case Resin Requalification								
G	07-112	Safe & Arm (New Build) Process Review				☑				
G	07-114	Parker TVC H-Bridge Shoot-through during T4 testing	Ø			☑				
G	07-138	Taurus Stage 1 TVA Kit Changes	$\square$			$\square$				
G	07-144	Orion Motor Nozzle Rayon Replacement								
G	07-169	Taurus - TDRSS Transmitter PDR (LCT2 Xmtr)	☑			☑				



## OCO - Launch Site

Julie Schneringer

LAUNCH SERVICES PROGRAM

Aug Sep Oct

G G G

LSSP	Planned	Released		
Preliminary	07/2007	08/27/2007		
Baseline	02/2008			

### **UNIQUE REQUIREMENTS**

LAUNCH SITE UNIQUE

Encapsulation in PPF

PPF

Commercial PPF

Spacecraft OPS

Fueling

G G G

Aug Sep Oct

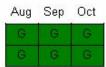


# OCO - Business

Ken Carr

## LAUNCH SERVICES PROGRAM

Budget Contracts



Milestone	Date
Milestone 1A	11/15/2003
Milestone 1B	11/15/2004
Milestone 1C	11/15/2004
Milestone 1D	8/1/2005
Milestone 2A	10/15/2005
Milestone 2B	11/15/2005
Milestone 2C	02/15/2006
Milestone 2D	02/15/2006
Milestone 2E	10/15/2006
Milestone 3A	11/15/2006
Milestone 3B	11/15/2006
Milestone 4	04/15/2007
Milestone 5	08/15/2007
Milestone 6	03/15/2008
Milestone 7	06/15/2008
Milestone 8	08/15/2008
Milestone 9	11/15/2008

Open Milestone Payment
Paid Milestone

		Contract Status		
Launch Services				
Contract Mod	Number	Description		
	Mod 10	Launch delay from 08/13/2007 - 09/15/2008 and Softride a	addition	
	Mod 17	Test Payload Adapter Fitting support		
	Mod 24	Addition of non-standard services: Umbilical harness,Test	Isolators & Instrun	nent Purge
	Mod 31	Ballast Ring for launch vehicle		
There are no LD Contract I	Mods			
Task Assignments	Number	Description	Completion Date	Invoice Paid Date
	SP-24.001	Soft-Ride coupled loads analysis using XL environment		
	SP-24.002	Upper stage motor production hold (non-mission funds)		
	SP-24.003	RF/EMI compatibility study		
	SP-24.004	Payload CDR Support		
	SP-24.005	Umbilical connector test support		
	SP-24.006	Trajectory Feasibility Study		
There are no PPF Contrac				
	CL INIOGS			
There are no Issues.				



# OCO - Safety and Mission Assurance

Laura McDaniel

		atus	Evidence of Completion			
	Complete	In Work		Aug	Sep	Oct
Quality				G	G	Υ
Software / Hardware Problems		☑	The Taurus vehicle is under certification efforts by LS SMA and NASA LSP. Due to outstanding Data Requests for Taurus vendors from previous site visits, all hardware and software fabrication operations are not fully certified.	G	G	Υ
Alerts		$\overline{\mathbf{v}}$	No issues	G	G.	G
Audits/Inspections/Surveillances		$\overline{\mathbf{v}}$	No issues or concerns	G	G	6
Limited Life Items		$\checkmark$	No issues	G	G	G
Reliability				G	G	G.
FMEA/Fishbones/Equivalent		☑	Failure analyses assessments have been initiated along with vehicle certification planning	G	G	G
Reliability Assessments		☑	Reliability assessment of reliability requirement for certification is in progress. Design Reliability Report from Orbital is 10 months behind schedule (originally due December 15).	G	6	G
Safety				G	G	G
Requirements Definitions		$\overline{\mathbf{Q}}$	EWR 127-1 Requirements Checklist - Completed. Out for Review.	G	G	G
Range Safety & Mission Flight Rules			In Work (Range Safety)	G	G	G
Licenses/Use Authorizations		$\checkmark$	In work	G	G	G
Safety Documentation		$\overline{\mathbf{v}}$	No issues identified to date	G	G	G
Non-compliances		$\overline{\mathbf{v}}$	S/C: Non-compliance to be written for spacecraft contingency offload	G	G	G
Contingency Planning			No issues identified to date	G	G	G
Mission Assurance				G	G	G
Lessons Learned		☑	No previous NASA Taurus missions - Other KSC LLs will be reviews/addressed	G	G	G
First Flight/Mission Unique items		$\overline{\mathbf{v}}$	Certification Effort in work	G	G	G
est/Qualification/Certification			Certification Effort in work	G	G	G
Mission Assurance Assessments			No issues	G	G	G
Risk Management		$\overline{\mathbf{v}}$	Risk Management System is working properly	G	G	G



# OCO Comm & Telemetry

Ralph Mikulas and Nathan Wood

#### LAUNCH SERVICES PROGRAM

## Communications

Voice Comm

Data Comm

Networks

Video Comm

Timing

RF Comm

LSSP Comm Annex

Aug	Sep	Oc.

-10,005,000	1200000	1000000
0	9	G
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

## Telemetry

**Decommutation Tables** 

Data Integrity Test

Software Lockdown

Software Inventory

Console Configuration

Console Checkout

0	0	0
0	0	0
0	0	0

Aug Sep Oct

U	U	٥
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0



## MSL Project Summary

#### John F. Kennedy Space Center LAUNCH SERVICES PROGRAM MSL Mission 2009/09/15 Launch Date Sep Oct Aug Launch Vehicle Atlas V OVERALL MISSION Launch Period Window TBR/Time/Instant./dual daily PPF PHSF MISSION MANAGEMENT Sep Oct LAUNCH SITE Oct SAFETY & MISSION ASSURANCE Sep Oct Aug Sep Aug Aug Observatory Status LSSP Y Υ Mission Assurance Manifest/Range Customer Inputs Safety Integrated Schedule PPF Quality ICD Launch Site Unique Reliability CDRLs (S/C & LSC) 0 0 Spacecraft OPS BUSINESS **ENGINEERING** COMM & TELEMETRY Budget Launch Vehicle Communications Contracts Mission Specific Telemetry 0 0 Certification Mission Analysis Υ NUCLEAR LEGEND Launch Approval ERS/ERB Proceeding on Plan Launch PAD/GSE Y LV Data Books Area of Concern Mission Unique IV&V 0 Security 0 Significant Problem R Radiation Safety Not Evaluated 0 DOWNRANGE TELEMETRY Facility Not Applicable N/A

0

0

0

0

0

0

0

Ground Stations

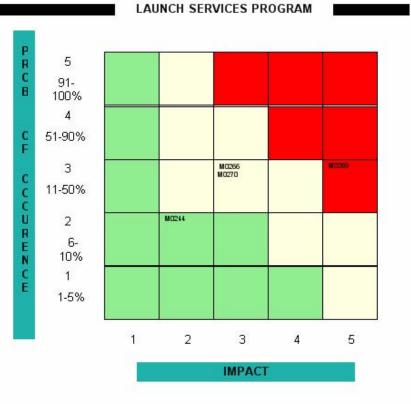
Deployables

P-3/OTTR



# MSL - Open/Accepted Risks

	8	Condition
RYG Trend	RiskID	Consequence
G	M0244	MSL mass growth has significantly decreased launch vehicle performance margins which are used to provide MSL with launch opportunity days and finite launch windows
		Increased probability of MSL missing the 2009 Mars launch opportunity.
γ	M0269	Lower Environmemtal Control System mission unique design has 50% margins at PDR timeframe.
1		Inability to provide cooling for the MMRTG would delay mission.
Υ	M0266	MSL spacecraft GN2 and battery cooling requirements remain undefined.
1		LV engineering products and implementation may not meet milestones, or costs may be very high
Υ		Firm critical ECS power supply fault tolerance requirements are not defined.
	M0270	MSL target specification delivery may be late
G		Atlas trajectory design may be delayed





# MSL - Actions / Issues / Concerns

LAUNCH SERVICES PROGRAM	
	ĺ
	LAUNCH SERVICES PROGRAM

Mission Summary Map	G/Y/R	ISSUES / CONCERNS	WI/ERS/Risk/ Problem	Open Date	Due Date
Engineering	Y	Additional requirements not captured in LSTO are resulting in unplanned task order. Items include: spacecraft 28v power, additional lightning suppression assembly requirements that are out of scope of original proposal.	WI	3/1/07	
Engineering	G	RP Tank Long Term Redesign	ERS-06-305	7/01/07	4/1/08
Engineering	Υ	Lower Environmemtal Control System mission unique design has 50% margins at PDR timeframe.	M0269	9/1/07	12/01/07
Engineering	Υ	MSL spacecraft GN2 and battery cooling requirements remain undefined.	M0266	9/01/07	12/01/07
Engineering	G	MSL target specification delivery may be late	M0270	9/1/07	3/1/08



# MSL - Significant Events

Accomplished	
Reduced mission NOA by \$500K at the request of the Project to fund HRS chiller procurement.	10/01/2007-10/12/2007
Delivery of test PLA to JPL	10/09/07-10/09/07

Planned	
Updated spacecraft mass received on September 15. Increase is to 4000 kg. Contract modification signed on 10/31/06. CDR baseline remains at 4000 kg. Risks still exist related to TPS and actuator design issues. Project has reduced this to a watch	09/15/2006- 10/31/2007
ECS fault tolerance discussions and task continue following completion of TIM in July 2007. Task assignments for studies are in work. Evaluation is proceeding well with good support and execution. Next TIM planned for early November.	03/01/2007- 12/31/2007
GN2 purge and battery cooling requirement continues to be worked by JPL. SOW continues to be refined. JPL has finally hired a principle engineer to coordinate these requirements across the spacecraft systems. Still incomplete and will require a Del	02/28/2007- 10/31/2007
The next Coupled Loads Analysis cycle has been requested by JPL, moved up from mid-2008. Coordinating the delivery of s/c model inputs. Time history TA will again be required. TA has been ATP's. Initial results delivered to JPL.	07/13/2007- 11/15/2007
A Delta MUPDR is required due to inadequate requirements definition in several areas at MUPDR. ULA, KSC, and JPL have several items to complete to prepare for a successful review. Tentatively planned for first week of December, pending closure of inp	09/13/2007- 12/14/2007



# MSL Mission Management

Tammy Harrington

#### LAUNCH SERVICES PROGRAM

Mission	
Launch	Date

Orbit Requirement

Launch Vehicle Class
Launch Period Window

PPF

Mass (kg) PAD

	MSL
	2009/09/15
(	C3: 23-11 (max/min) km/sec^2
	Atlas V
TE	3R/Time/Instant./dual daily
	PHSF
	4000kg
	SLC 41

Observatory Status	
Observatory Status	

Schedule

Budget Deliverables

Testing ATLO

Instrument

Aug	Sep	Oct
Υ	Y	Y
6	Y	Υ
G	6	G
G	Y	Υ
0	0	0
0	0	0
0	0	0

Mission Center:

Program:

PM LVI

ММ

IE LSIM

PIM MAM

MCE MTE JPL Mars

Richard Cooke Dave Woerner/Jim Colvin

Tammy Harrington	
Jim Behling	
John Hueckel	
Randy Mizelle	
Laura McDaniel	-
Marty Lougheed	
Rolando Nieves	-



ICD 6 6 6

There are no signed	There are no SCNs in
SCNs	Review
00148	Leview

Launch	Vehicle
Status	

Integrated Schedule CDRLs (S/C & LSC)

Manifest/Range

Ground Stations Deployables

P-3/OTTR

G	G	G
G	G	G
G	G	G
0	0	0
D	0	0
0	0	0



# MSL - Engineering

Jim Behling

## LAUNCH SERVICES PROGRAM

	Aug	Sep	Oct
Launch Vehicle	G	G	G
Payload Fairing	0	0	0
First Stage	0	0	0
Second Stage	0	0	0
Third Stage	0	0	0
Payload Attach Fitting	0	0	0
Other	0	0	0
Mission Specific	G	G	Υ
Certification	G	G	G
Mission Analysis	G	G	Υ
ERS/ERB	G	G	G
Launch PAD/GSE	G	G	Υ
Mission Unique IV&V	0	0	0

REQUIREMENT VERIFICAT	TION STATUS
NUMBER OF REQUIREMENTS	0
VERIFIED TO DATE	O
LAUNCH PAD / GSE MODS (I	F APPLICABLE)

LAUNCH PAD I GSE MODS (IF APPLICABLE	)
Lower PLF ECS	
Access Platforms	
VIF Level 5 Structural Support	
Clean Enclosures	
GN2 Purge Upgrades	
Aeroshell ECS	

# MISSION UNIQUE STUDIES (IF APPLICABLE) There are none.



## MSL - Mission ERB Status

Jim Behling

7			ERB Req?		Board Held?			Closure		
R/Y/G	ERS#	TITLE	Y	N	Y	N	N/A	AI	ENG.	OCE
G	05-354	MSL IRD Review	☑		$\square$			☑	$\square$	☑
G	06-370	MSL Mission Unique Requirements Review	☑							
0	06-371	MSL Mission Peculiar Design Review	☑			$\square$				
Υ	06-372	MSL Mission Unique PDR	$\square$		$\square$					
0	06-373	MSL Mission Unique CDR				$\square$				



## MSL - Vehicle ERB Status

Jim Behling

			ERB Req?		Board Held?			Closure		
R/Y/G	ERS#	TITLE	Υ	N	Υ	N	N/A	Al	ENG.	OCE
G	06-305	RP Tank Long Term Redesign	☑		$\square$					
G	ERS-07-265	First Flight of Basotect/MA100 foam FAP								



## MSL - Launch Site

John Hueckel

LAUNCH SERVICES PROGRAM



LSSP	Planned	Released
Preliminary	09/15/2008	
Baseline	03/16/2009	

	Aug	Sep	Oct
CUSTOMER INPUTS	G	G	G
DELIVERABLES	Aug	Sep	Oct
Security and Badging	G	G	G
Training and Personnel Cert	G	G	G
Contingency Plans	G	G	G
Safety LSIM	G	G	G
Radiation Control	G	G	G
Operational Plans	G	G	G

## UNIQUE REQUIREMENTS

	Aug	Sep	Oct
LAUNCH SITE UNIQUE	G	G	G
Planetary Protection Verification laboratory	G	G	G
PPF	G	G	G
Trailer for Spin operations	G	G	G
Spacecraft OPS	0	0	0



# MSL - Business

Randy Mizelle

## LAUNCH SERVICES PROGRAM

Open Milestone Payment

Paid Milestone

Budget Contracts

Aug	Sep	Oct
G	G	G
G	G	G

Milestone	Date
Milestone 1	6/30/06
Milestone 10	12/15/08
Milestone 11	3/15/09
Milestone 12	6/15/09
Milestone 13	9/15/09
Milestone 2	9/20/06
Milestone 3	4/02/07
Milestone 4	07/24/2007
Milestone 5	10/11/2007
Milestone 6	12/15/07
Milestone 7	3/15/08
Milestone 8	6/15/08
Milestone 9	9/15/08

Contract Status								
Launch Services								
Contract Mod	Number	Description						
	NLSL-083	ATP Mission						
	NLSL-091	S/C Mass & Backup Launch opportunity revisions, ATP of Mission Unique Services: 3- Interleaved Telemetry, 11- Mission Unique Flight Design and Analyses, 12 - External Access Platforms, 13 - VIF Level 5 Structural Support & Platform configuration, 14 - CI						
	NLSL-094	ATP of Mission Uniqu Services 8.0 - Diode Assemblies & 9.0 - Enhanced PLA Cleaning & UV Inspection						
	NLSL-098	3% Volume Buy Discount Application						

ask Assignments	Number	Description	Completion Date	Invoice Paid Date
	NLSB-199	Pre-ATP Trajectory	Cancelled	
	NLSL-053	Pre-ATP Trajectory	4/1/06	4/24/06
	NLSL-054	AV NEPA & Launch Approval SAR Databook support	12/22/2006	1/18/07
	NLSL-060	MUS 11 Pre-Authorization	12/31/2006	2/12/07
	NLSL-073	Separation Pointing Accuracy Evaluation	5/30/07	6/28/07
	NLSL-074	PDLC Interface Data Output Requests	4/30/07	05/16/2007
	NLSL-079	Early Integrated Thermal Analysis	10/31/2007	
	NLSL-080	28 Volt Power	07/30/2008	
	NLSL-081	Final Design Load Cycle (FDLC) Interface Data Output Requests	11/30/2007	
	NLSL-083	PECS As Backup to VIF ECS Feasibility Assessment	12/15/2007	
nere are no PPF Contraci nere are no Other Contrac				
Issues				



# MSL - Safety and Mission Assurance

Laura McDaniel

	LAUNCH SERVICES		ES PR	OGRA	MA	
Assurance Verification Areas	Sta	atus	Evidence of Completion			
	Complete	In Work		Aug	Sep	Oct
Quality				G	G	Υ
Software / Hardware Problems		☑	Monitoring RP tank redesign/qual and AV-09 FIV anomaly investigation.	G	G	Υ
Alerts		$\overline{\checkmark}$	No issues	G	G	G
Audits/Inspections/Surveillances		$\overline{\mathbf{v}}$	No issues or concerns	G	G	G
Limited Life Items		$\overline{\mathbf{v}}$	No issues	G	G	G
Reliability				G	G	G
FMEA		✓	No significant issues.	G	G	G
Reliability Assessments		$\overline{\mathbf{v}}$	No significant issues.	G	G	G
Safety				G	G	G
Requirements Definitions		$\overline{\mathbf{v}}$	Tailoring in work.	G	G	G
Range Safety & Mission Flight Rules		$\overline{\mathbf{v}}$	No significant issues.	G	G	0
Licenses/Use Authorizations		$\overline{\mathbf{v}}$	No significant issues.	G	G	G
Safety Documentation			Phase II S/C MSPSP review in work	0	G	0
Non-compliances		$\overline{\mathbf{v}}$	No significant issues.	G	G	G
Contingency Planning		$\checkmark$	No significant issues.	G	G	G
Mission Assurance				G	G	Υ
Lessons Learned		✓	No significant issues.	G	G	G
First Flight/Mission Unique items		$\checkmark$	Multiple mission unique items needing review.	G	G	G
Test/Qualification/Certification			RP-1 tank re-qualification in-work, Nothing significant has changed, this item should have remained yellow	G	G	Y
Mission Assurance Assessments		☑	No significant issues.	G	G	G
Risk Management		$\overline{\mathbf{v}}$	No significant issues.	G	G	6

# MSL Comm & Telemetry

Marty Lougheed and Rolando Nieves

#### LAUNCH SERVICES PROGRAM

## Communications

Voice Comm

Data Comm

Networks

Video Comm

Timing

RF Comm

LSSP Comm Annex

Aug	Sep	Oct
G	G	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

## Telemetry

Decommutation Tables

Data Integrity Test

Software Lockdown

Software Inventory

Console Configuration

Console Checkout

Aug	Sep	Oct
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0



## MSL Nuclear

John Giles

## LAUNCH SERVICES PROGRAM

Launch Approval LV Data Books Security Radiation Safety

Radiation Safety

Facility

Aug	Sep	Oct
G	G	G
G	G	G
G	G	G
G	G	G
G	G	G